

Claims 1-22 remain pending in the application, with Claims 1, 21 and 22 being independent. Claims 1, 3, 4, 6, 9-12, 14, 16, 18 and 20-22 have been amended herein.

Claims 1-3, 7, 8, 21 and 22 were rejected under 35 U.S.C. § 102 as being anticipated by European Patent Application No. 0 917 096 (Kawanabe et al.). Claims 4, 9-12 and 14-20 were rejected under 35 U.S.C. § 103 as being unpatentable over Kawanabe et al. in view of U.S. Patent No. 5,634,730 (Bobry) and U.S. Patent No. 5,293,319 (DeSha et al.). Claim 13 was rejected under § 103 as being unpatentable over Kawanabe et al. in view of Bobry and further in view of U.S. Patent No. 5,923,820 (Cunnagin et al.)\*. Claims 5 and 6 were rejected under § 103 as being unpatentable over Kawanabe et al. in view of U.S. Patent No. 6,447,085 (Yagi et al.). These rejections are respectfully traversed.

As is recited in independent Claim 1, the present invention relates to a printing apparatus for printing on a printing medium using a printhead. The apparatus includes an interface, a memory, discriminating means, write control means and printing control means. The interface is connected to a host and receives information from the host. The memory stores characteristic information of the printhead. The discriminating means discriminates whether or not a command sent from the host based on information inputted to the host from any of a plurality of input means is a command including the characteristic information of the printhead. The write control means controls to write the characteristic

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\*Although paragraph 3 on page 5 of the Office Action lists “Ackley (US 5841954)” as being a reference applied in the § 103 rejection of Claim 13, the Examiner confirmed in a telephone conversation on October 23, 2002, that this citation is in error and should not have been applied to Claim 13.

information of the printhead into the memory in accordance with a discrimination result of the discriminating means. The printing control means controls the printhead to print in accordance with the characteristic information written into the memory.

With the above arrangement, the printing apparatus can receive characteristic information of a printhead from various routes because the printing apparatus has an interface with a host capable of receiving information inputted from any of a plurality of input means. The plural input means can include, but are not limited to, a keyboard, a barcode reader and a network connected to a database.

As is recited in independent Claim 21, the present invention relates to a printhead on whose external surface information is appended. The information is inputted to a host computer, which transmits print information to a printing apparatus with which the printhead is used for printing, so as to output characteristics information of the printhead based on the information to the printing apparatus.

As is recited in independent Claim 22, the present invention relates to an accompanying material to which information is appended. The material accompanies a printhead and the information is inputted to a host computer, which transmits print information to a printing apparatus with which the printhead is used for printing, so as to output characteristics information of the printhead based on the information to the printing apparatus.

With the above arrangements, a user can read appended information and input such information using a keyboard of the host, and the printing apparatus can receive such information and update characteristic information of the printhead.

Kawanabe et al. relates to a printer that has a memory for storing a printer profile parameter. The profile information can be outputted from the image printing device to a host computer upon request. The host computer utilizes the printhead profile information to produce compensation parameters to be sent from the host computer to the printhead for printing.

However, Applicants respectfully submit that Kawanabe et al. describes only a printer informing the host of printhead information. No other component or input means can inform the host of such information. Accordingly, the host computer in Kawanabe et al. has only one input means for inputting printhead information.

Thus, Kawanabe et al. fails to disclose or suggest at least discriminating whether or not a command sent from a host based on information inputted to the host from any of a plurality of input means is a command including characteristic information of a printhead, as is recited in independent Claim 1.

Applicants further submit that Kawanabe et al. does not disclose or suggest a printhead, or accompanying material, to which information is appended, which such information being inputted to a host computer, as is recited in independent Claims 21 and 22. Kawanabe et al. further fails to disclose or suggest the host computer transmitting print information to a printing apparatus with which the printhead is used for printing, so as to output characteristics information of the printhead based on the information to the printing apparatus, as is also recited in independent Claims 21 and 22.

Thus, Kawanabe et al. fails to disclose or suggest important features of the present invention recited in independent Claims 1, 21 and 22.

Bobry was cited by the Examiner for teaching a Hewlett-Packard printhead identifiable by a part number. DeSha et al. describes a postage meter system and suggests that postage value and database printing may be printed in the form of a barcode. Cunnagin et al. describes that data may be communicated through a LAN in a printing system. Yagi et al. was cited for teaching an ink jet printhead. However, these citations are not believed to remedy the deficiencies of Kawanabe et al. noted above with respect to the independent claims.

Thus, independent Claims 1, 21 and 22 are patentable over the citations of record. Reconsideration and withdrawal of the §§ 102 and 103 rejections are respectfully requested.

For the foregoing reasons, Applicants respectfully submit that the present invention is patentably defined by independent Claims 1, 21 and 22. Dependent Claims 2-20 are also allowable, in their own right, for defining features of the present invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

  
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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO SPECIFICATION

The paragraph starting at page 3, line 8 has been amended as follows.

However, such memories increase the cost of the overall printer apparatus accordingly. In the case of a [disposal] disposable type of printhead, a non-volatile memory is also disposed every time the printhead is exchanged. This is not economical. Furthermore, even in the case of a printhead which is not of [disposal] the disposable type but can be repetitively used by exchanging or refilling only ink (or an ink tank), since the [life time] lifetime of the printhead is normally much shorter than that of the printer apparatus main body, the printhead must be exchanged several times during the [life time] lifetime of the printer main body. This is also not economical [like] as with the case of using the [disposal] disposable type of printhead.

The paragraph starting at page 5, line 19 has been amended as follows.

According to [one] another aspect of the present invention, the foregoing object is attained by providing a printing system including the above-described printing apparatus, and a host connecting to the printing apparatus and capable of communicating with a second system via a network, the host comprising: input means for inputting individual information of a printhead indicated on the printhead or an accessory of the printhead in a format identifiable to human or an electronic device via man-machine

interactive operation or the electronic device; retrieve means for accessing [to] the second system via the network on the basis of the individual information of the printhead inputted by the input means, and retrieving characteristic information of the printhead corresponding to the individual information of the printhead; and transfer means for transferring the characteristic information of the printhead retrieved by the retrieve means to the printing apparatus.

The paragraph starting at page 6, line 11 has been amended as follows.

Note that the network includes a LAN or Internet, and the individual information of the [print head] printhead can be a production number of the printhead.

The paragraph starting at page 9, line 19 has been amended as follows.

Fig. 1 is a perspective view showing the outer appearance of an ink-jet printer 20 (hereinafter referred to as a printer) as a typical embodiment of the present invention. Referring to Fig. 1, a carriage HC engages with a spiral groove [5004] 5005 of a lead screw [5005] 5004, which rotates via driving force transmission gears 5009 to 5011 upon forward/reverse rotation of a driving motor 5013. The carriage HC has a pin (not shown), and is reciprocally scanned in the directions of arrows a and b in Fig. 1. An integrated ink-jet cartridge IJC which incorporates a printhead IJH and an ink tank IT is mounted on the carriage HC. Reference numeral 5002 denotes a sheet pressing plate,

which presses a paper sheet against a platen 5000, ranging from one end to the other end of the scanning path of the carriage. Reference numerals 5007 and 5008 denote photocouplers which serve as a home position detector for recognizing the presence of a lever 5006 of the carriage in a corresponding region, and used for switching, e.g., the rotating direction of the motor 5013. Reference numeral 5016 denotes a member for supporting a cap member 5022, which caps the front surface of the printing head IJH; and 5015, a suction device for [sucking] suctioning ink residue through the interior of the cap member. The suction device 5015 performs suction recovery of the printing head via an opening 5023 of the cap member 5015. Reference numeral 5017 denotes a cleaning blade; and 5019, a member which allows the blade to be movable in the back-and-forth direction of the blade. These members are supported on a main unit support plate 5018. The shape of the blade is not limited to this, but a known cleaning blade can be used in this embodiment. Reference numeral 5021 denotes a lever for initiating a suction operation in the suction recovery operation. The lever 5021 moves upon movement of a cam 5020, which engages with the carriage, and receives a driving force from the driving motor via a known transmission mechanism such as clutch switching.

The paragraph starting at page 11, line 3 has been amended as follows.

The capping, cleaning, and suction recovery operations are performed at their corresponding positions upon operation of the lead screw [5005] 5004 when the

carriage reaches the home-position side region. However, the present invention is not limited to this arrangement as long as desired operations are performed at known timings.

The paragraph starting at page 11, line 14 has been amended as follows.

Fig. 2 is a block diagram showing the arrangement of a control circuit of the printer 20. Referring to Fig. 2 showing the control circuit, reference numeral 1700 denotes [an] a USB interface for inputting a printing signal from a personal computer 21 (hereinafter referred to as a host); 1701, an MPU; 1702, a programmable ROM for storing a control program executed by the MPU 1701 and necessary control data; and 1703, a DRAM for storing various data (the printing signal, printing data supplied to the printhead IJH, and the like). Reference numeral 1704 denotes a gate array (G.A.) for performing supply control of printing data to the printhead IJH. The gate array 1704 also performs data transfer control among the interface 1700, the MPU 1701, and the RAM 1703. Reference numeral 1710 denotes a carrier motor for carrying the printhead IJH; and 1709, a conveyance motor for conveying a printing medium (e.g., a printing sheet). Reference numeral 1705 denotes a head driver for driving the printhead IJH; and 1706 and 1707, motor drivers for driving the conveyance motor 1709 and the carrier motor 1710.

The paragraph starting at page 13, line 18 has been amended as follows.

As the printhead IJH detachable from the printer apparatus used in this embodiment, a plurality of types of printheads are available: for example, a monochrome printhead, color printhead, photo-quality printhead, and the like. A user can selectively attach an optimal one of these printheads according to the user's need. Each of these printheads has a signal terminal which can output a 2-bit signal regardless of [their types] its type. When a printhead is mounted on the printer 20, it outputs a 2-bit ON/OFF signal, so that the printer 20 can identify the type of currently mounted printhead. In this arrangement, up to four different printhead types can be identified.

The paragraph starting at page 17, line 16 has been amended as follows.

When a user who has purchased the printer apparatus attaches a printhead for the first time, when a user who has purchased a commercially available optional printhead attaches that printhead for the first time, or when the [life time] lifetime of a printhead has expired and a user exchanges that printhead with a separately purchased one, he or she activates utility software (which is attached to the printer apparatus in the form of a CD-ROM or the like together with driver software and the like upon shipping from a factory) on the host 21, and inputs the characteristic information of the printhead printed on the packaging paper box 25 at a keyboard or the like of the host 21 in accordance with an instruction on the window displayed on a display (LCD, CRT, PDP, or the like) of the host 21 upon executing that software.

The paragraph starting at page 18, line 16 has been amended as follows.

Once the characteristic information is written into the EEPROM 1708, a print process is performed using that characteristic information. Since the characteristic information of the printhead is written for each type of printhead, it need only be written once when the printhead is attached to the printer for the first time. Hence, the user need not write the characteristic information every time he or she exchanges the printhead [by] with another type of printhead according to his or her purpose (e.g., the user exchanges a monochrome printhead [by] with a color printhead).

The paragraph starting at page 23, line 20 has been amended as follows.

Note that in the above embodiments, the liquid discharged from the printhead has been described as ink, and the liquid contained in the ink tank has been described as ink. However, the liquid is not limited to ink. For example, the ink tank may contain [processed] processing liquid or the like discharged to a print medium to improve fixability or water repellency of a printed image or to increase the image quality.

The paragraph starting at page 24, line 1 has been amended as follows.

The embodiments described above have exemplified a printer, which comprises means (e.g., an electrothermal transducer, laser beam generator, and the like) for

generating heat energy as energy utilized [upon] for execution of ink discharge, and causes a change in state of [an] the ink by the heat energy, among the ink-jet printers. According to this ink-jet printer and printing method, a high-density, high-precision printing operation can be attained.

The paragraph starting at page 28, line 14 has been amended as follows.

Further, the object of the present invention can be also achieved by providing a storage medium (or recording medium) storing software program code for performing the aforesaid processes [to] in a system or an apparatus, reading the program code with a computer (e.g., CPU, MPU) of the system or apparatus from the storage medium, then executing the program. In this case, the program code read from the storage medium realizes the functions according to the embodiments, and the storage medium storing the program code constitutes the invention. Furthermore, besides the aforesaid functions according to the above embodiments [are] being realized by executing the program code which is read by a computer, the present invention includes a case where an OS (operating system) or the like working [on] in the computer performs a part of or entire processes in accordance with designations of the program code and realizes functions according to the above embodiments.

The paragraph starting at page 29, line 5 has been amended as follows.

Furthermore, the present invention also includes a case where, after the program code read from the storage medium is written in a function expansion card which is inserted into the computer or in a memory provided in a function expansion unit which is connected to the computer, a CPU or the like contained in the function expansion card or unit performs a part of or entire [process] processes in accordance with designations of the program code and realizes functions of the above embodiments.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A printing apparatus for printing on a printing medium using a printhead, comprising:

an interface which is connected to a host and receives information from the host;

a memory for storing characteristic information of the printhead;

discriminating means for discriminating whether or not a command sent from the host based on information inputted to the host from any of a plurality of input means is a command including the characteristic information of the printhead;

write control means for controlling to write the characteristic information of the printhead into said memory in accordance with a discrimination result of said discriminating means; and

printing control means for controlling the printhead to print in accordance with the characteristic information written into said memory.

3. (Amended) The apparatus according to claim 1, wherein the printhead is [a printhead] detachable from a printing apparatus main body, and is [a printhead] attached to said printing apparatus [by selecting] after being selected from among plural types of printheads by a user.

4. (Amended) The apparatus according to claim 1, wherein said discriminating means includes means for receiving a command outputted from the host to which the characteristic information of the printhead indicated on the printhead or an accessory of the printhead in a format identifiable [to] by a human or an electronic device is inputted by a man-machine interactive operation or the electronic device.

6. (Amended) The apparatus according to claim 5, wherein the inkjet printhead comprises an electrothermal transducer for generating heat energy to be [given] applied to ink so as to discharge the ink by utilizing the heat energy.

9. (Amended) The apparatus according to claim 4, wherein the format identifiable [to] by a human is at least one of a digit and a character string.

10. (Amended) The apparatus according to claim 4, wherein the format identifiable [to] by a an electronic device is a barcode.

11. (Amended) The apparatus according to claim 4, wherein the indication in a format identifiable [to] by a human or an electronic device is a described, adhered or formed indication.

12. (Amended) A printing system including a printing apparatus according to claim 1, and a host connecting to the printing apparatus and capable of communicating with a second system via a network, said host comprising:

input means for inputting individual information of a printhead indicated on the printhead or an accessory of the printhead in a format identifiable [to] by a human or an electronic device via man-machine interactive operation or the electronic device;

retrieve means for accessing [to] the second system via the network on the basis of the individual information of the printhead inputted by said input means, and retrieving characteristic information of the printhead corresponding to the individual information of the printhead; and

transfer means for transferring the characteristic information of the printhead retrieved by said retrieve means to the printing apparatus.

14. (Amended) The printing system according to claim 12, wherein the individual information of the [print head] printhead is a production number of the printhead.

16. (Amended) The printing system according to claim 12, wherein the format identifiable [to] by a human is at least one of a digit and a character string.

18. (Amended) The printing system according to claim 12, wherein the format identifiable [to] by a the electronic device is a barcode.

20. (Amended) The printing system according to claim 12, wherein the indication in a format identifiable [to] by a human or an electronic device is a described, adhered or formed indication.

21. (Amended) A printhead [to which] on whose external surface information is appended, wherein the information is inputted to a host computer, which transmits print information to a printing apparatus [to] with which said printhead is [mounted] used for printing, so as to output characteristics information of said printhead based on the information to the printing apparatus.

22. (Amended) An accompanying material to which information is appended, wherein the material [is accompanied with] accompanies a printhead, the information is inputted to a host computer, which transmits print information to a printing apparatus [to] with which said printhead is [mounted] used for printing, so as to output characteristics information of said printhead based on the information to the printing apparatus.

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